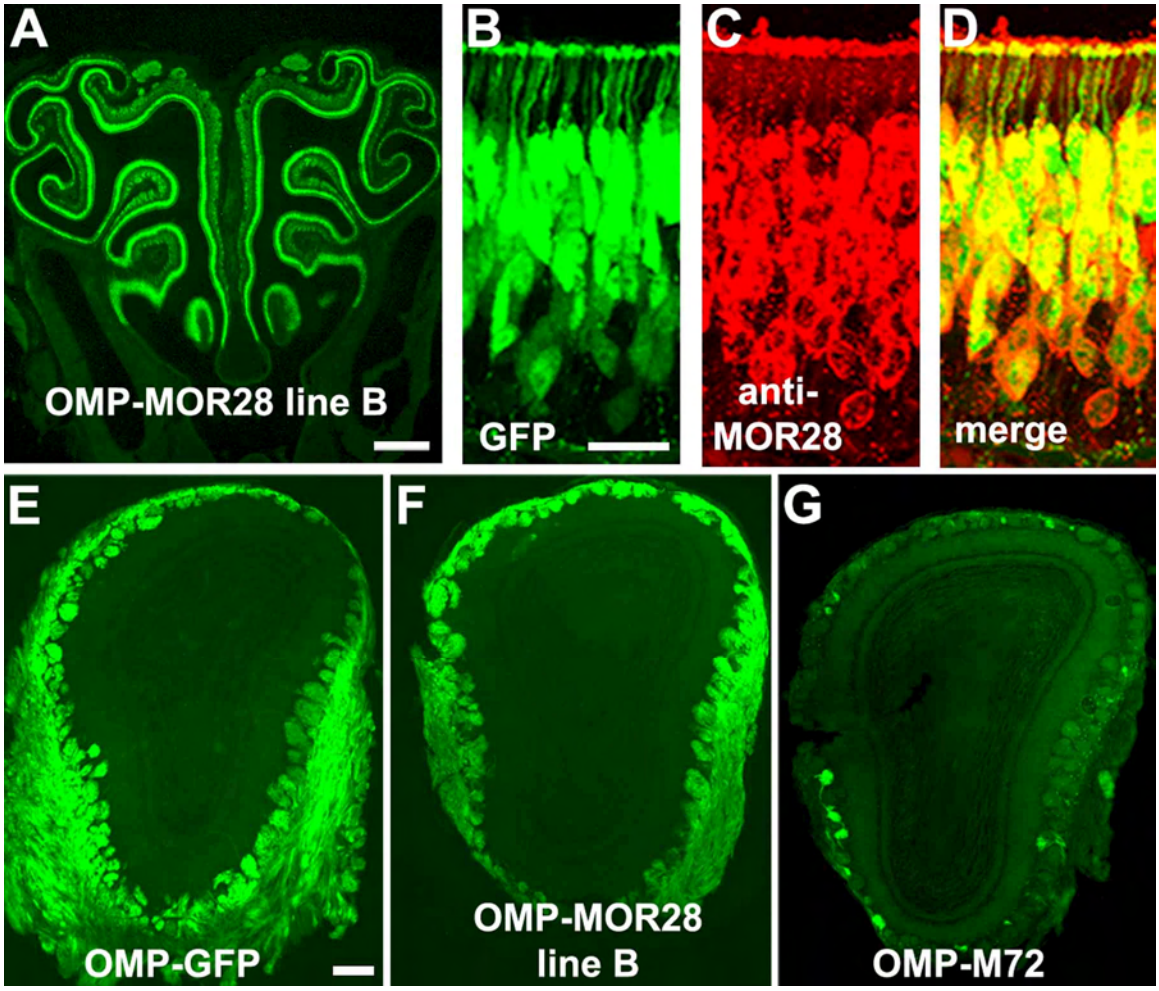
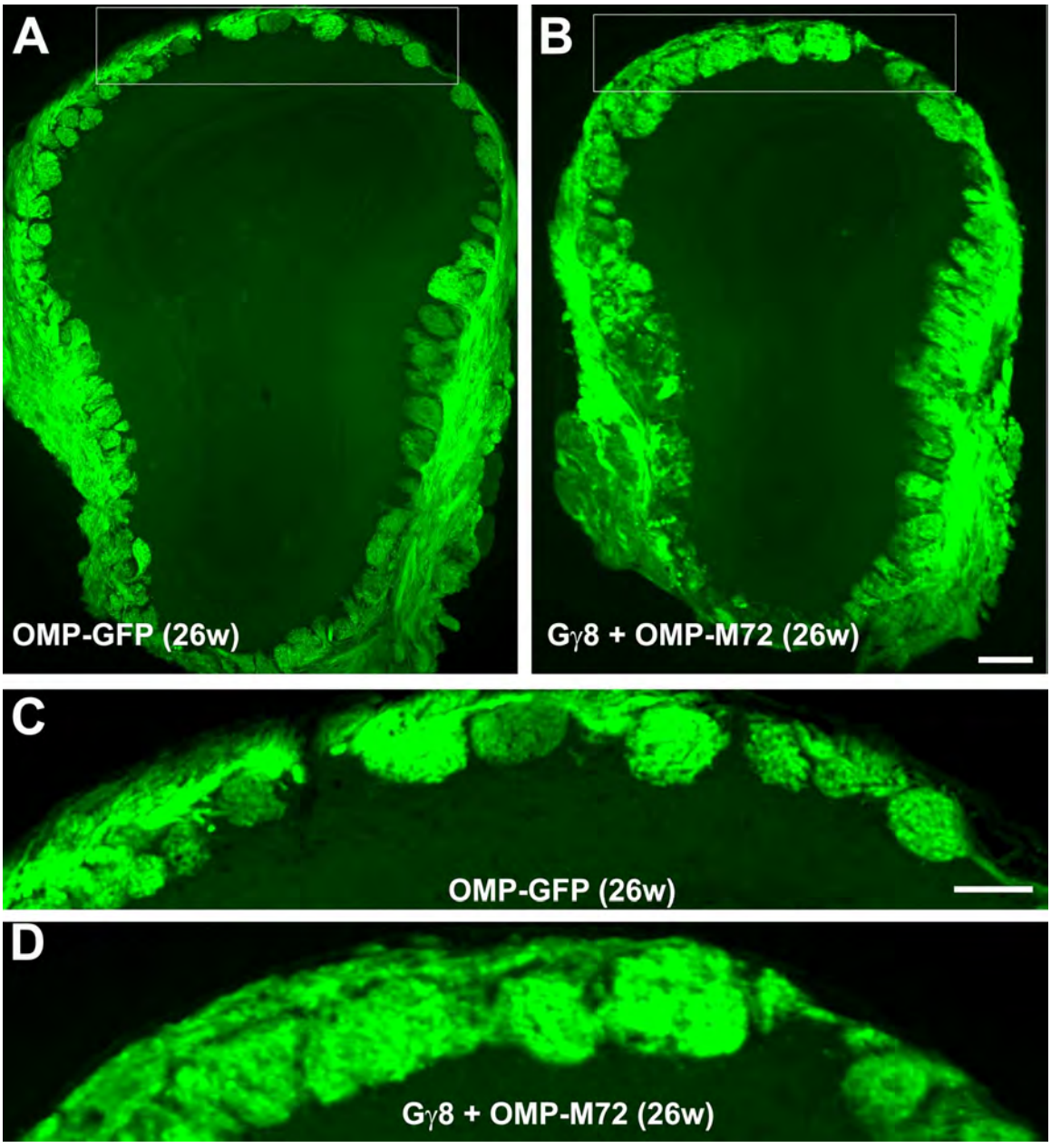
Supplementary Figure 1. OMP-MOR28 line B is expressed in the vast majority of OSNs



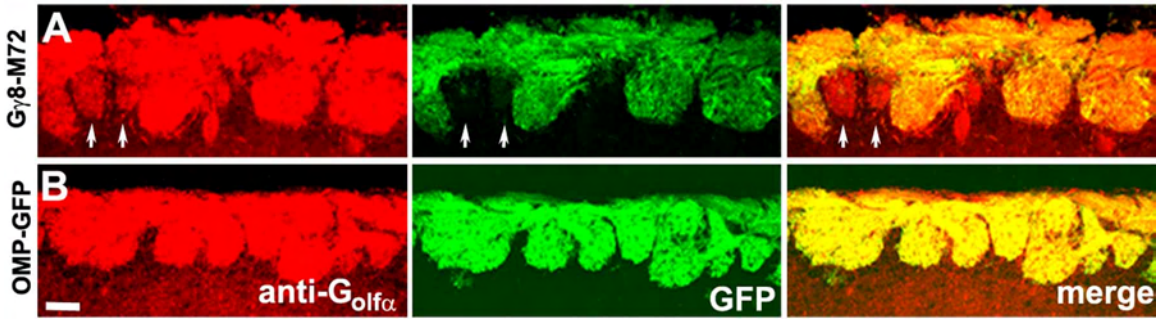
36 of 37 lines of OMP-tgOR mice expressed the TetO-tgOR in a large subset (10-30%) of OSNs while the remaining TetO-OR line (MOR28-line B) was consistently expressed in many more neurons with expression detected in as many as 90% of OSNs (a-d). Shown are a low (a) and high (b) magnification views of the co-expressed GFP fluorescence (green) as well as MOR28 immunofluorescence (c, red) and a merged image (d). Sections through the OB of control mice (OMP-GFP) clearly show the targeting of labeled OSNs to glomeruli (e) that are indistinguishable in size and distribution from the projections of tgOR expressing OSNs in OMP-tgMOR28 line B (f). For comparison a section through the OB of another OMP-tgOR line shows that only a handful of glomeruli are strongly labeled (g). Scale bars: 250 µm, (a); 20 µm, (b-d); 200 µm, (e-g). It is unclear why OMP-MOR28-line B is expressed in most OSNs while the majority of OMP-tgORs exhibit much more restricted expression. We speculate that transgene specific positional effects account for the unusually complete expression of a small subset of OMP-tgOR lines.

Supplementary Figure 2. Gγ8 + OMP-tgOR expressing OSNs project to enlarged glomeruli throughout the olfactory bulb



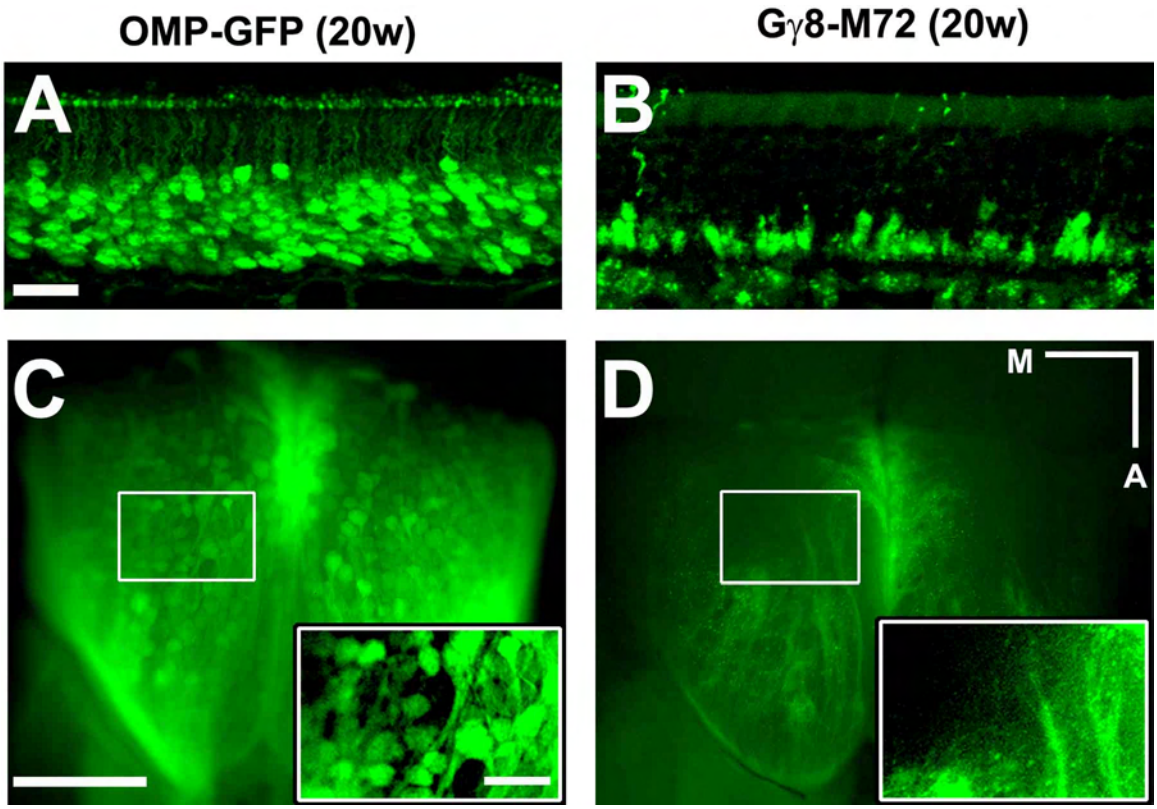
Sections through the OB of 6 month old control (OMP-GFP, panel a, c) and Gγ8 + OMP-M72 (b, d) mice allow direct comparison of the size and distribution of OSN projections to glomeruli. Note that GFP fibers rarely penetrated beyond the glomerular layer of the bulb either in control or tgOR expressing mice; Scale bar, 200 µm (a, b); 100 µm (c, d).

Supplementary Figure 3. The glomerular layer of Gγ8-tgOR mice contain large transgene positive and small transgene negative glomeruli



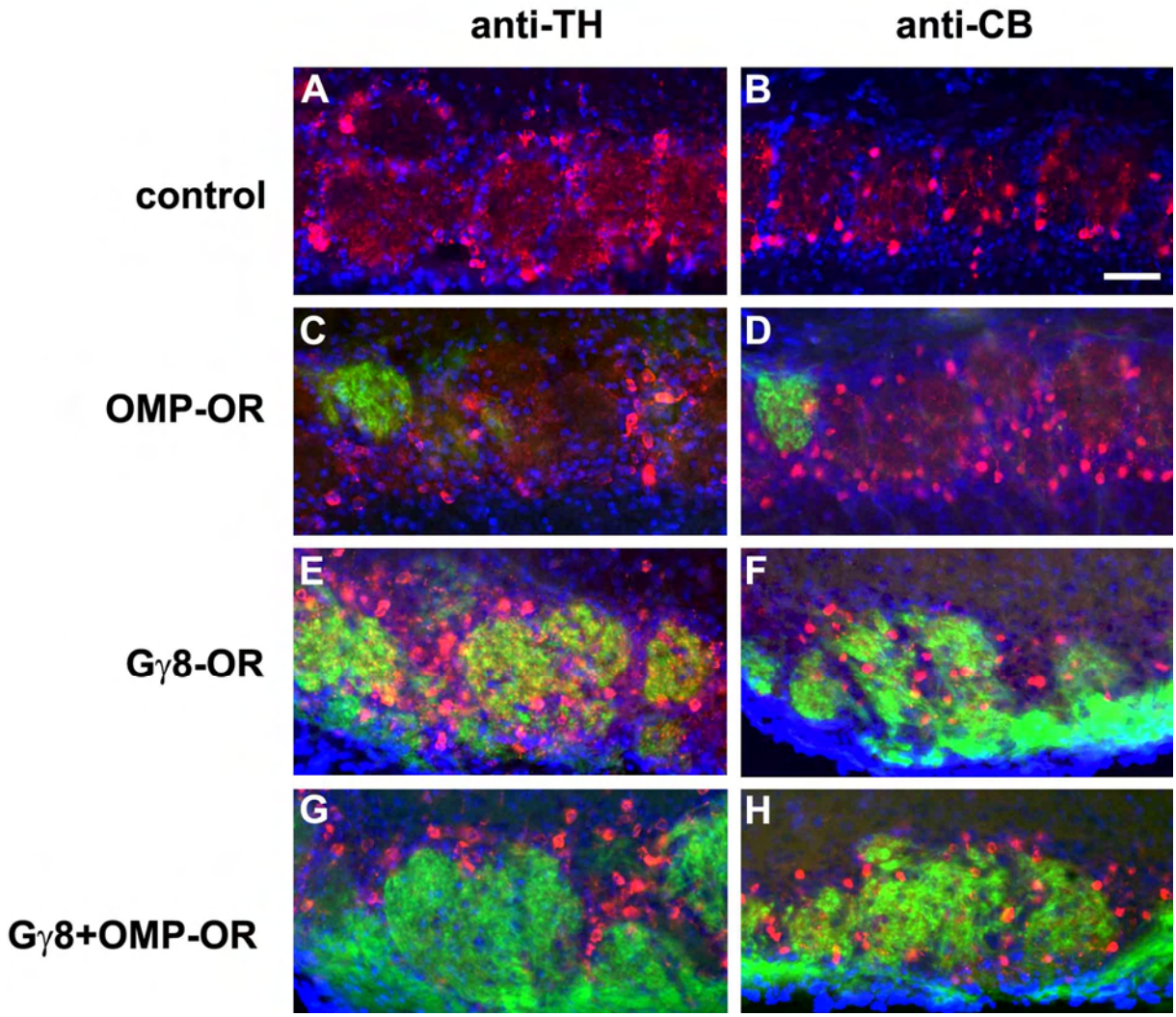
(a) Confocal microscopy of the dorsal OB immunostained for $G_{olf}\alpha$ demonstrates that Gγ8-tgOR mice have small tgOR negative glomeruli interspersed amongst the larger GFP (and Gγ8-tgOR) positive glomeruli. By comparison OMP-GFP control animals demonstrate complete overlap between GFP and $G_{olf}\alpha$ staining in more uniformly sized glomeruli; scale bar 50 µm.

Supplementary Figure 4. Older Gγ8-tgOR animals have reduced tgOR expression with few tgOR-OSNs targeting glomeruli



Confocal images of the MOE of 20 week old control OMP-GFP (a) and Gγ8-M72 mice (b) highlight the small population of basally located OSNs that express Gγ8-tgOR in adult mice. Whole mount images of the olfactory bulb of OMP-GFP controls (c) and Gγ8-tgOR (d) illustrate that OSNs expressing Gγ8-M72 project to the outer nerve layer of the OB but not identifiable glomeruli in these older animals. Scale bars 20 µm (a, b) 1 mm, main panel, 250 µm, inset, (c, d); medial (M) and anterior (A) directions in whole mount images are indicated.

Supplementary Figure 5. Tyrosine hydroxylase and calbindin expressing interneurons are present around the glomeruli of normal and tgOR-expressing mice.



Representative sections through the OB of 3 week old mice were stained for markers of major classes of interneuron (red) and counterstained using DAPI (blue); where present GFP-fluorescence was also monitored (green). Tyrosine hydoxylase (TH) and calbindin (CB) are markers of two major classes of interneurons that surround the glomeruli of control animals (a, b). In OMP-tgOR (c, d), Gγ8-tgOR (e, f), and Gγ8+OMP-tgOR (g, h) mice both sets of interneuron are also found surrounding both glomeruli that contain projections from tgOR- and ntOR-expressing neurons; scale bar 50 µm.